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MAR 01 1993

U.S. Nuclear Regulatory Commission
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Gentlemen:

In the Matter of the Application of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

WATTS BAR NUCLEAR PLANT (WBN) - RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION - WATTS BAR FIRE PROTECTION REPORT (TAC M63648)

The purpose of this letter is to reply to NRC's letter dated December 15, 1992, that requested additional information on the WBN Fire Protection Report which was submitted by letter dated February 5, 1992.

Enclosure 1 provides a restatement of the concerns in NRC's letter dated December 15, 1992, and the associated TVA response.

Should there be any questions regarding this information, please telephone Paul Pace at (615) 365-1824.

Very truly yours,

W. J. Museler

William J. Museler

Enclosure
cc: See page 2

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ENCLOSURE

WATTS BAR NUCLEAR PLANT
FIRE PROTECTION REPORT
REQUEST FOR ADDITIONAL INFORMATION

By letter dated December 15, 1992, NRC requested additional information to support the review of the Watts Bar Fire Protection Program (FPR). The following is TVA's response to that request. The NRC's request/question is stated and the TVA response follows.

SECTION 3.1 - NRC QUESTION

10 CFR 50 Appendix R, Section III.L, stipulates "During the postfire shutdown, the reactor coolant system process variables shall be maintained within those predicted for a loss of...." However, the FPR Section 3.1.4, pg. III-4 was found to state "Following the event..." Please clarify the difference, if any, in TVA's interpretation of this requirement.

TVA RESPONSE

There is no difference in interpretation between the requirements of 10 CFR 50 Appendix R, Section III.L and FPR Section 3.1.4, pg. III-4. The TVA evaluation was performed on the basis that the cited requirement applies to the entire 72-hour postfire shutdown.

SECTION 3.2 - NRC QUESTION

FPR Pg. III-4, Subsection 3.2.4.f states: "If a tank is used as a supply to a pump and a pump will automatically switch to another supply on low level, then the tank level is not required."

(1) Are the control circuits which monitor level in required tanks, and are relied on to automatically transfer pump suction to another source, known to be free of fire damage?

(2) Has an analysis been performed to determine the length of time the level in the primary tanks will be available prior to auto switching to an alternate source?

TVA RESPONSE

(1) For required tanks, control circuits are not assured to be free of fire damage. For fire areas where fires have the ability to damage circuits associated with automatic pump suction transfer, manual actions are identified to realign pump suction. For fire areas where fires do not

have the ability to damage circuits associated with automatic pump suction transfer, credit for automatic transfer is taken.

(2) An analysis to determine the time available for automatic transfer has not been performed. As discussed above, it is assumed that fires occurring in areas containing circuits associated with automatic pump suction transfer (affecting pumps required for safe shutdown) will affect the automatic function and will require manual actions to be taken. Analyses have been performed which determine the length of time allowable for manually switching from a primary tank to an alternate source. These analyses are documented in calculation WBN-OSG4-165, "Manual Actions Required for Safe Shutdown Following a Fire --10CFR50 APPENDIX R--." The calculation methodology determined the amount of time available to accomplish the actions before Safety Limits would likely be exceeded. Also the amount of time that would be required for an operator to physically accomplish the actions was determined by experienced operator estimates. Operating instructions are currently under development that implement the manual operating actions required in the calculation. The instructions will prioritize the manual actions and assign tasks in the proper sequence to insure that they are accomplished within the calculated allowable times.

At WBN, the primary tanks under consideration are the Volume Control Tank (VCT), Condensate Storage Tank (CST), and Refueling Water Storage Tank (RWST). For the VCT, the analysis showed that the allowable time for manually switching to the RWST is 30 minutes. For the CST, the analysis showed that the allowable time for manually switching to the ERCW is 120 minutes. Once charging is aligned from the VCT to the RWST, it remains in this alignment for the remainder of the postfire shutdown.

SECTION 3.2.11 - NRC QUESTION

This section states that "The system and components used for Safe Shutdown (SSD) shall be capable of performing their intended function within their designed limits and if possible as demonstrated by previously accepted analysis." Please explain the TVA interpretation of the phrase "if possible as demonstrated by previously accepted analysis."

TVA RESPONSE

This section will be reworded to delete the phrase "and if possible as demonstrated by previously accepted analysis."

SECTION 3.5 - SEPARATION CRITERIA - NRC QUESTION

Subsection 3.5.2 does not precisely agree with separation criteria contained in Section III.G.2 of Appendix R to the extent that the words "or fire hazards" appear to have been deleted from the criteria stated in this section of the Fire

Protection Report (FPR), Specifically, in addressing the 20-feet separation criteria, Appendix R section III.G.2 states, in part "...20 feet with no intervening combustibles or fire hazards..." The criteria presented in Subsection 3.5.2 appears to have deleted the phrase "or fire hazards." Please explain.

Additionally, the following statement is not clear: "If intervening combustibles are present then the fire area shall be protected by a suppression system." Please explain the intent and implementation of this statement on the Watts Bar Fire Protection Program.

TVA RESPONSE

There was no distinction made between the intervening combustibles and fire hazards. Section 3.5 of the FPR will be changed to include the words "or fire hazards."

Safe Shutdown (SSD) components (equipment and/or cables) separated by 20 or more feet are protected by an expanded sprinkler system. The full explanation of this scheme is documented in Section V, Item 1.1.4 of the FPR. This method of compensating for intervening combustibles has been discussed with NRC staff in meetings on August 29, 1984 and September 13, 1984, and in a letter from Thomas M. Novak to H. G. Parris dated November 6, 1984. The staff approved this method and similar deviation requests at Sequoyah and exemption request at Browns Ferry.

SUBSECTION 5 - ASSOCIATED CIRCUITS - NRC QUESTION

Section 5.3.1 states, "low level (V-1) and medium level (V-2) signal circuits which are not required for shutdown are exempt from consideration." Please clarify this statement by defining V-1 and V-2 circuits and explaining the TVA technical basis for why they should be exempt from consideration.

TVA RESPONSE

Design Basis Document WB-DC-30-5, "Power, Control, and Signal Cables for Use in Category I Structures," Section 6.2.1 defines V-1 and V-2 cables as follows:

> V-1 cables - low level signal - Those cables to thermocouples, strain gauges, thermal converters, and RTDs that are 100 millivolt or less.
>
> V-2 cables - medium level signal - Those cables to and from the computer (other than thermocouples), instruments associated with transmitter circuits, resistance temperature devices (RTD) greater than 100 millivolt, rotor eccentricity and vibration detectors, shielded annunciator cables with solid state equipment, code, alarm, and paging (CAP) cables for source B, telephone cables (alternate routing), and word processor cables.

The technical basis for exempting V-1 and V-2 circuits is provided in Section 3.4 of Design Criteria WB-DC-30-4, "Separation/Isolation":

> V-1 and V-2 cables are signal level cables and do not carry sufficient energy for a fire to occur under faulted conditions (i.e., the cable insulation would not reach auto-ignition temperature due to a fault).

NRC QUESTION

Subsection 5.3.2.b states that circuits supplied from required power supplies which were not required and which penetrate fire zone barriers were identified.

The concern here is for nonessential circuits which may be powered from redundant sources and located in a common large fire area but do not actually penetrate any physical fire zone barrier. Given the assumption stated in Section 3.4.2 of the FPR that the "zone of influence of a postulated fire" is a 20-ft diameter cylinder from floor to ceiling in areas with automatic detection and automatic suppression or areas bounded by fire rated structures, whichever is smaller, in which equipment, components, and cables may be damaged by the fire," it is not clear how this definition was applied for cases involving nonessential circuits powered from redundant power sources located in a large common fire area. For example, it may be quite possible to have redundant required power supplies located in a common fire area such as the Auxiliary Building which meet the separation criteria stated in Section 3.4.2. However, in such a case, nonessential circuits connected to the power supplies may not specifically "penetrate fire zone barriers" but may be susceptible to damage from a single fire if not evaluated for the same level of separation. Please explain if, and how such circuits were identified for adequate separation.

TVA RESPONSE

All circuits on the required boards are identified as potential associated circuits and evaluated for adequate protection and selective coordination. Subsection 5.3.2.b will be revised to delete "which penetrate fire zone barriers."

NRC QUESTION

With regard to large fire areas where the "zone of influence of a postulated fire" given in Section 3.4.2 was applied, please explain how minimum cable lengths as described in Section 5.3.2.d were calculated.

TVA RESPONSE

The selective coordination study determined the maximum credible current due to a fault at one of the following locations:

a. The load terminals of the protective device, or

b. the point closest to the distribution panel where the nonessential cable could be in the zone of influence of a postulated fire which also involves a required cable of the redundant safe shutdown path.

Obviously any fire causing a fault at the load terminals could damage the power distribution panel; therefore, the redundant safe shutdown path would be used. Examples of the condition described in Part b above are as follows:

(1) The cable exits the distribution panel out the bottom (through a floor slab) and is therefore in a different zone. The length of cable used in the equation would be 10 feet.

(2) The cable exits the distribution panel out the top and extends more than 20 feet before it could enter into a zone of influence involving the redundant path cables. The length of cable used in the equation would be 20 feet or less. If the distance to closest zones of influence was 40 feet, then the length of cable used in the equation would be 40 feet or less, etc.

SECTION 3.0 - FIRE ZONE HAZARD ANALYSIS - NRC QUESTION

The Safe Shutdown Analysis subsection of various fire area/zones contains somewhat ambiguous statements. Specifically:

Section 3.1.1.4 states "No fire safe shutdown (FSSD) components within zone,"

Section 3.1.26.4 states "There are no required (emphasis added) FSSD components in this room,"

Section 3.1.61.4 states "There are no interactions with (emphasis added) redundant safe shutdown components in this room,"

Section 3.1.75.4 states "There are no required FSSD components located in these rooms nor are there any FSSD components that could be damaged by a fire in any of these rooms (emphasis added)."

Please provide TVA's interpretation of these statements and explain their difference in meaning as well as application.

TVA RESPONSE

Section 3.1.1 addresses the Waste Holdup Tank Room and Waste Evaporator Feed Pump Room. Neither of these rooms contains a component (valve, pump, motor, circuit, etc.) that is required to safely shutdown in the event of a fire. The phrase "no FSSD components" is used to describe rooms that do not contain any of the FSSD components identified for any fire.

Section 3.1.26 addresses the RHR Heat Exchanger 1B Room (713.0-A11). In this room there are no FSSD components that are required to safely shutdown for a fire in this room. The phrase "no required FSSD components" is used for rooms that contain FSSD components that are used for some fires but not for a fire in the room.

Section 3.1.61 addresses the 125-V Vital Battery Room I. There are no unprotected FSSD components other than Vital Battery Channel I batteries and circuits located in this room (e.g., any redundant circuit would be fire wrapped). The phrase "no interaction with redundant FSSD components" means that either the redundant FSSD components are adequately separated such that a single fire could not affect both, or one set of redundant components is protected from fire damage.

Section 3.1.75 addresses the Roof Access Air Lock and the two Mechanical Equipment Rooms. There are no FSSD components located in these rooms. The words "There are no FSSD components located in ..." means the same as in item 3.1.1 above.

NRC QUESTION

Descriptions of Fire Area Zones/Areas are insufficient to the extent that:

(1) The specific location of each fire zone/area is not given; and

(2) required and or redundant components located in fire zone/area described are not identified.

TVA RESPONSE

(1) The fire areas at WBN are identified as the Auxiliary Building (Section 3.1 of Tab IV, Fire Hazards Analysis for Fire Areas/Zones), Control Building (Section 3.2), Reactor Building (Section 3.3), Diesel Generator Buildings (Section 3.4), and Intake Pumping Station (Section 3.5). Each room/zone in each of these areas is identified as subsections (e.g., I-674.0 - A1 and A2). However, to take advantage of the good compartmentation at WBN, these buildings will be divided into multiple fire areas. The final results of this effort will be transmitted to NRC by June 3, 1993.

(2) Individual components are not listed in the FHA section of the Fire Protection Report. The systems are identified and the Interaction Analysis Calculations for those systems are identified. WBN has used a systems approach rather than a fire zone/area method.

SECTION 3.1 - AUXILIARY BUILDING - NRC QUESTION

Regarding Subsection 3.1.1, Zone I-674.0-A1 and A2, Subsection 3.1.1.4 of the safe shutdown evaluation states "No FSSD components within zone." Please define the term "components" as used in the analysis.

TVA RESPONSE

The term "components" is defined in Section 1.0, Page IV-1. Component refers to any equipment (pump, motor, valve, distribution panel, etc.) and/or cable or sense line.

NRC QUESTION

Regarding Subsection 3.1.6, RHR pump room 1B-B, Zone 8-676.0-A10, Subsection 3.1.6.4 states "No redundant components of RHR located in room, therefore, SSD is achievable." Are any required components other than RHR located in the room?

TVA RESPONSE

There are no FSSD components other than those for RHR 1B-B located in the RHR 1B-B pump room.

NRC QUESTION

Regarding Subsection 3.1.7, RHR pump room 1A-A, Zone 9-676.0-A11, Subsection 3.1.7.4. Same comment as 3.1.6.4 above.

TVA RESPONSE

There are no FSSD components other than those for RHR 1A-A located in the RHR 1A-A pump room.

SECTION 2 - NRC QUESTION

Based on our preliminary review, we found that Section 2 references several supporting TVA documents. In order to continue our review, we are requesting TVA to provide the following documents referenced by the fire protection report:

Report Ref. No.	TVA Document No.	Title
2.2.1	WB-DC-40-51	Fire Protection of Safe Shutdown Capability
2.2.2	WB-DC-40-13	10CFR50 Appendix R Type I, II, III Items
2.2.3	WB-DC-40-62	Fire Protection
2.2.7	Drawing Series 47W240	Fire Compartmentation
2.2.8	WBN-OSG4-031	Equipment Required for Safe Shutdown per 10CFR50 App. R
2.2.9*	WBN-EEB-TI110-0054	Cable Block Diagrams
2.2.18**	Drawing Series 45E843	Appendix R Cable Routings
2.2.21	WBP-EVAR-9007004	Electric Power Keys 38, 39
2.2.27	WBN-OSG4-165	Manual Actions Required for Safe Shutdown Following a Fire
2.2.28	WBP-EVAR-9001012	Required Cable List Methodology
2.2.29	WB-DC-30-4	Separation/Isolation

TVA RESPONSE

The above listed documents are available to the staff reviewer at the Watts Bar site. Please contact Paul Pace at (615) 365-1824 for any assistance you might need concerning these documents.

* This calculation provided source information for the "Required Cable Calculations" WBP-EVAR-9004001 through -9004007. The current versions of the cable block diagrams are found in the WBP-EVAR-9004001 through -9004007 calculations.

** (NOTE: The drawing series listed in the reference section in the Fire Protection Report as 45E843 should be 45E893. This will be corrected in the Fire Protection Report). The Cable Separation Analysis is currently maintained on a set of working drawings at the Watts Bar site. These drawings are available for inspection by the staff reviewer. The referenced drawings, 45E893-Series Appendix R Cable Separation Drawings, are under development and will replace the working drawings.